

FCC Test Report

Product Name	Motorized Cellular Shade
Model No.	MCS1-A, MCS1-B
FCC ID	Q3V-MCS1

Applicant	NIEN MADE ENTERPRISE CO., LTD.
Address	23F.-1, No. 98, Shizheng N. 7th Rd., Xitun Dist., Taichung City 407, Taiwan (R.O.C.)

Date of Receipt	Jan. 14, 2022
Issued Date	Nov. 10, 2022
Report No.	2210413R-RFUSOTHV06-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

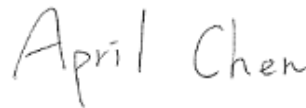
Issued Date: Nov. 10, 2022

Report No.: 2210413R-RFUSOTHV06-A



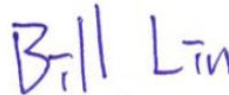
Product Name	Motorized Cellular Shade
Applicant	NIEN MADE ENTERPRISE CO., LTD.
Address	23F.-1, No. 98, Shizheng N. 7th Rd., Xitun Dist., Taichung City 407, Taiwan (R.O.C.)
Manufacturer	NIEN MADE ENTERPRISE CO., LTD.
Model No.	MCS1-A, MCS1-B
FCC ID	Q3V-MCS1
EUT Rated Voltage	AC 100-240V/50-60Hz DC 16.4V (Power Charger PB-01S) DC 24V (Power Charger PB-02)
EUT Test Voltage	AC 120V / 60Hz and DC 16.4V (Power by battery)
Trade Name	NORMAN, BLINDS.COM, AMERICAN BLINDS, VENETA, ACADIA LIVING
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Senior Project Specialist / April Chen)

Tested By :



(Senior Engineer / Bill Lin)

Approved By :



(Senior Engineer / Alan Chen)

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2210413R-Product Photos

Revision History

Report No.	Version	Description	Issued Date
2210413R-RFUSOTHV06-A	V1.0	Initial issue of report.	Nov. 10, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Motorized Cellular Shade
Trade Name	NORMAN, BLINDS.COM, AMERICAN BLINDS, VENETA, ACADIA LIVING
Model No.	MCS1-A, MCS1-B
FCC ID	Q3V-MCS1
Frequency Range	2415-2459MHz
Channel Number	3
Type of Modulation	GFSK
Antenna Type	PCB Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
SmartDial™	MFR: NienMade, M/N: DIAL01
Remote Control	MFR: NienMade, M/N: RC-A01
Remote Control	MFR: NienMade, M/N: RC-S01
DC Extension cord (Black)	MFR: NienMade, M/N: 35501-40108
Power Charger (Optional) (Black)	MFR: NienMade, M/N: PB-02
Power Charger (Optional) (Black) (GA)	MFR: NienMade, M/N: PB-01S
Power Charger (Optional) (White) (35E)	MFR: NienMade, M/N: PB-01S
36W Power Cable (Black)	MFR: NienMade, M/N: 84601-11725
36W Adapter	MFR: Unifive, M/N: UHVUU3036-240015SA Input: AC 100-240V, 50-60Hz 0.9A Output: DC 24V 1.5A, 36W Cable out: Non-Shielded, 1.55m with one ferrite core bonded.
65W Power Cable	MFR: NienMade, M/N: 84601-11721
65W Adapter	MFR: Unifive, M/N: CHDZD3065-240027PA Input: AC 100-240V, 50-60Hz 1.7A Output: DC 24V 2.7A, 64.8W Cable in: Non-Shielded, 1.0m.

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	INPAQ	RFPCA310503IMAB302	PCB Antenna	1.18dBi for 2.4GHz

Note: The antenna of EUT is conform to FCC 15.203.

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 15:	2415 MHz	Channel 39:	2439 MHz	Channel 59:	2459 MHz

Note:

1. The EUT is a Motorized Cellular Shade with a built-in 2.4G wireless transceiver.
2. Regarding to the operation frequency, the lowest, middle, and highest frequency are selected to perform the test.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
4. The EUT is including two models for different is listed as below:

Model name	Description
MCS1-A	Operating with Adapter
MCS1-B	Operating with Battery

5. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.249 for spread spectrum devices.

Test Mode	Mode 1: Transmit Mode 2: Normal mode
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1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Power Charger (Optional) + 36W Adapter:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Power Adapter	Unifive	UHVUU3036-240015SA	N/A	N/A
2 Power Charger (Optional) (Black)	NienMade	PB-02	N/A	N/A

Cable Type	Cable Description
A 36W Power Cable	Non-shielded, 1.55m, with one ferrite core bonded.
B DC Extension cord	Non-shielded, 2m

Power Charger (Optional):

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Power Charger (Optional) (Black) (GA)	NienMade	PB-01S	N/A	N/A

Cable Type	Cable Description
N/A	

36W Adapter:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Power Adapter	Unifive	UHVUU3036-240015SA	N/A	N/A

Cable Type	Cable Description
A 36W Power Cable	Non-shielded, 1.55m, with one ferrite core bonded.
B 36W Power Cable (Black)	Non-shielded, 0.6m

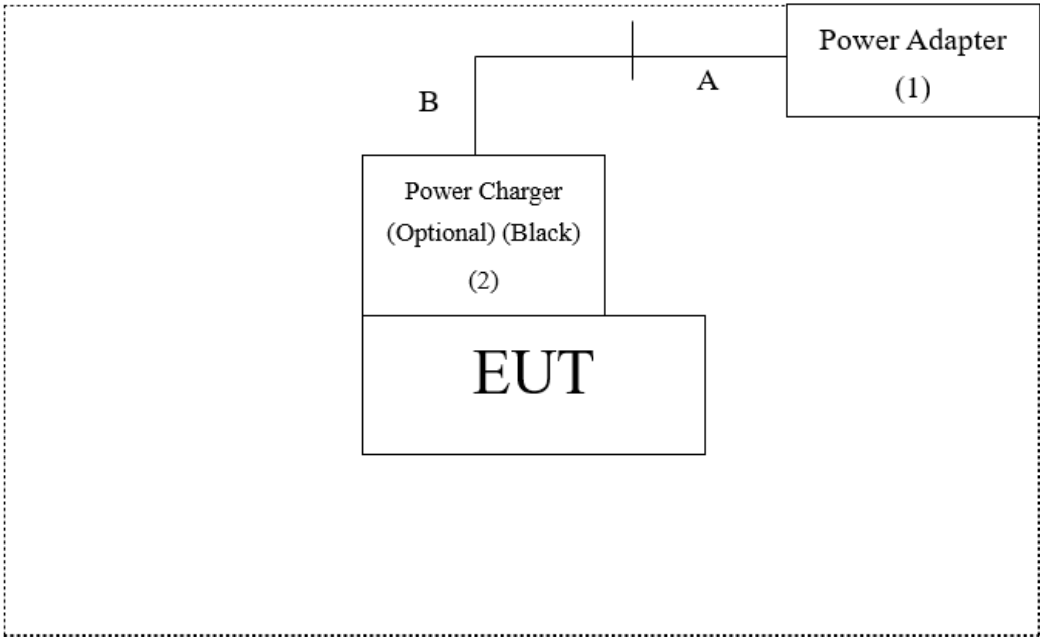
65W Adapter:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Power Adapter	Unifive	CHDZD3065-240027PA	N/A	N/A

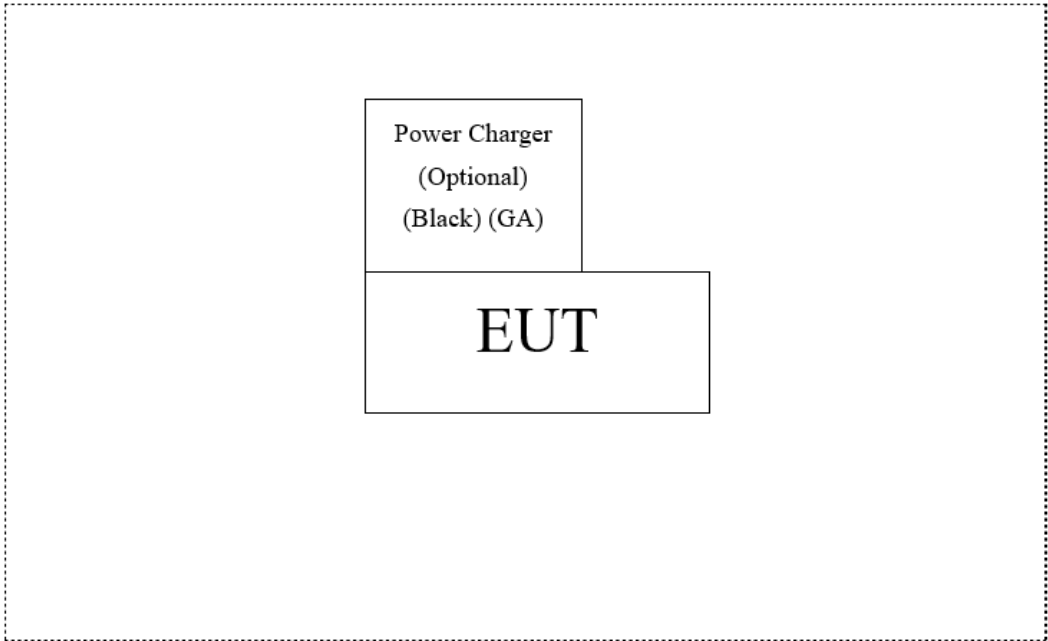
Cable Type	Cable Description
A 65W Power Cable	Non-shielded, 1.8m,
B 65W Power Cable	Non-shielded, 1m

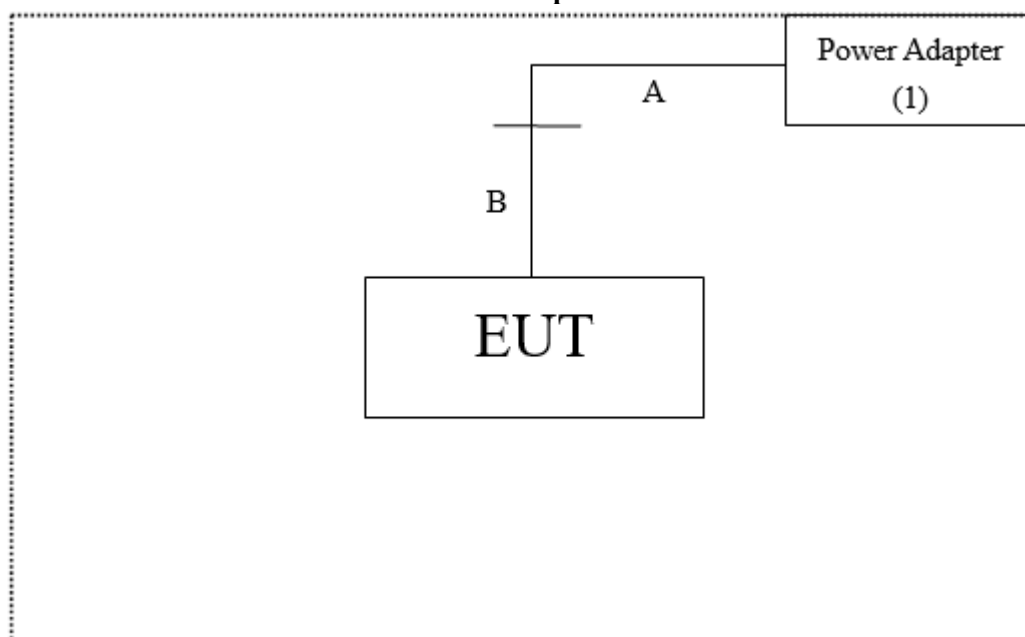
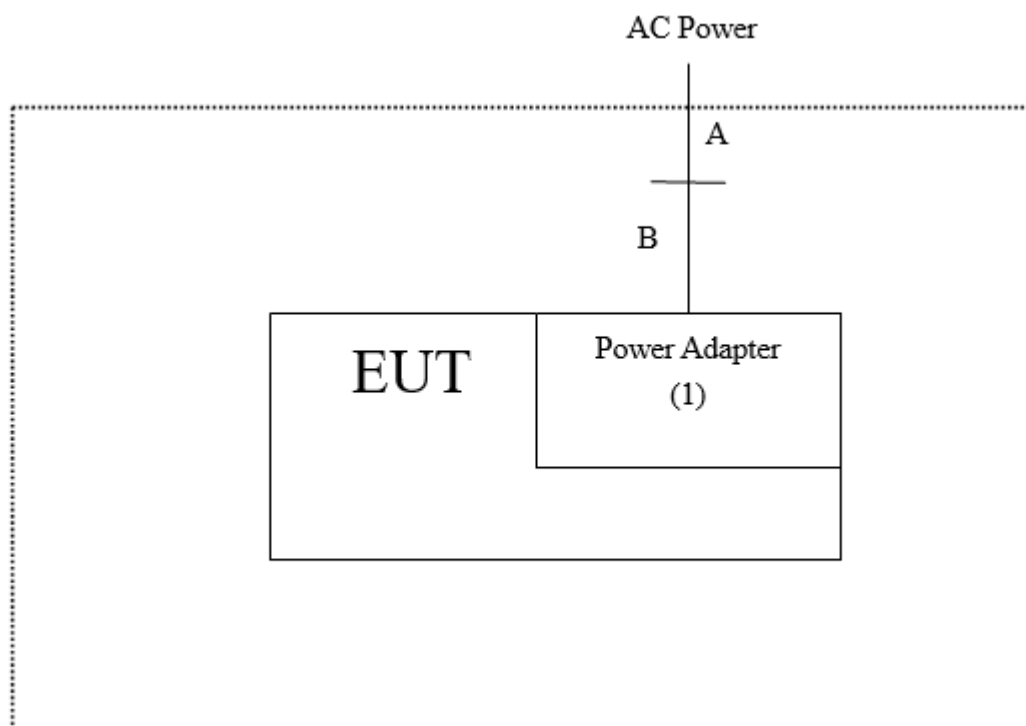
1.3. Configuration of Test System

Power Charger (Optional) + 36W Adapter:



Power Charger (Optional):



36W Adapter:**65W Adapter:****1.4. EUT Exercise Software**

- (1) Setup the EUT as shown in Section 1.3.
- (2) Provide the AC / DC Power Source.
- (3) Start the continuous transmit.
- (4) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	24.9 °C
	Humidity (%RH)	10~90 %	53.8 %
Radiated Emission	Temperature (°C)	10~40 °C	23.3 °C
	Humidity (%RH)	10~90 %	69.8 %

USA : FCC Registration Number: TW0033

Canada : CAB Identifier Number: TW3023 / Company Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan
Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.
Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /HY-SR01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021/06/19	2022/06/18
X	Two-Line V-Network	R&S	ENV216	101306	2022/05/23	2023/05/22
X	Two-Line V-Network	R&S	ENV216	101307	2022/05/04	2023/05/03
X	Coaxial Cable	SUHNER	RG400_BNC	RF001	2021/05/24	2022/05/23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9

For Conducted measurements /HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV40	101149	2022/03/25	2023/03/24
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2021/06/07	2022/06/06
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2021/05/17	2022/05/16
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2021/05/17	2022/05/16

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : RF Conducted Test Tools R3 V3.0.1.19 .

For Radiated measurements /HY-CB03

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	49611	2022/03/18	2023/03/17
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021/08/11	2022/08/10
X	Horn Antenna	ETS-Lindgren	3117	00227700	2021/10/12	2022/10/11
X	Horn Antenna	Com-Power	AH-840	101100	2021/10/04	2022/10/03
X	Pre-Amplifier	SGH	0301	20211007-10	2022/02/22	2023/02/21
X	Pre-Amplifier	SGH	PRAMP118	20200202	2022/03/23	2023/03/22
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2021/07/07	2022/07/06
	Pre-Amplifier	EMCI	EMC184045SE	980369	2022/05/12	2023/05/11
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314		
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
X	Filter	MICRO TRONICS	BRM50702	G251	2021/09/16	2022/09/15
	Filter	MICRO TRONICS	BRM50716	G188	2021/09/16	2022/09/15
X	EMI Test Receiver	R&S	ESR	102793	2021/12/15	2022/12/14
X	Spectrum Analyzer	R&S	FSV3044	101114	2022/02/11	2023/02/10
X	Coaxial Cable	SGH	SGH18	2021005-3	2022/01/05	2023/01/04
	Coaxial Cable	SGH	SGH18	202108-4		
	Coaxial Cable	SGH	SGH18	202110223-1		
	Coaxial Cable	SGH	HA800	GD20110222-3		

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

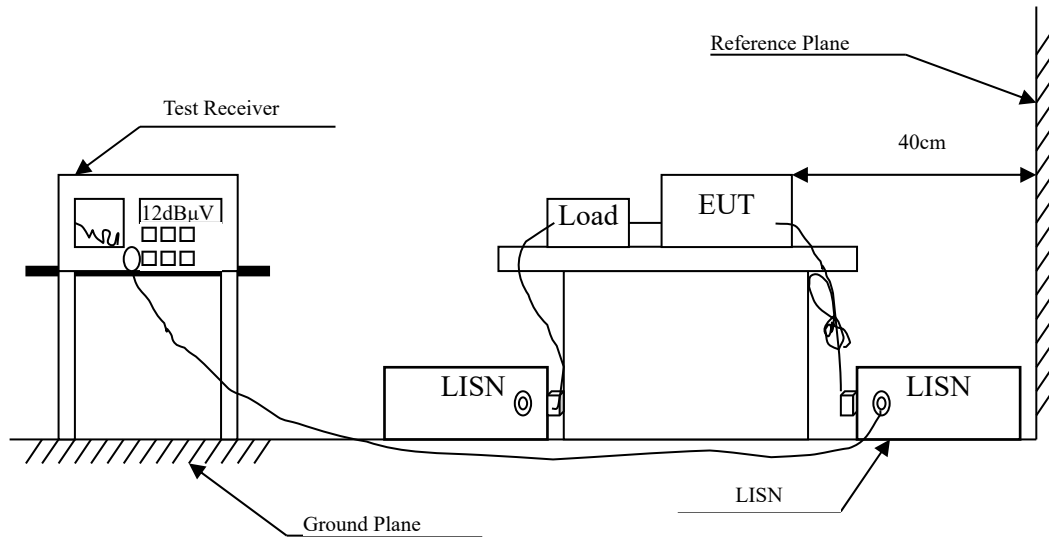
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Radiated Emission	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB
Band Edge	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB
Duty Cycle	± 2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

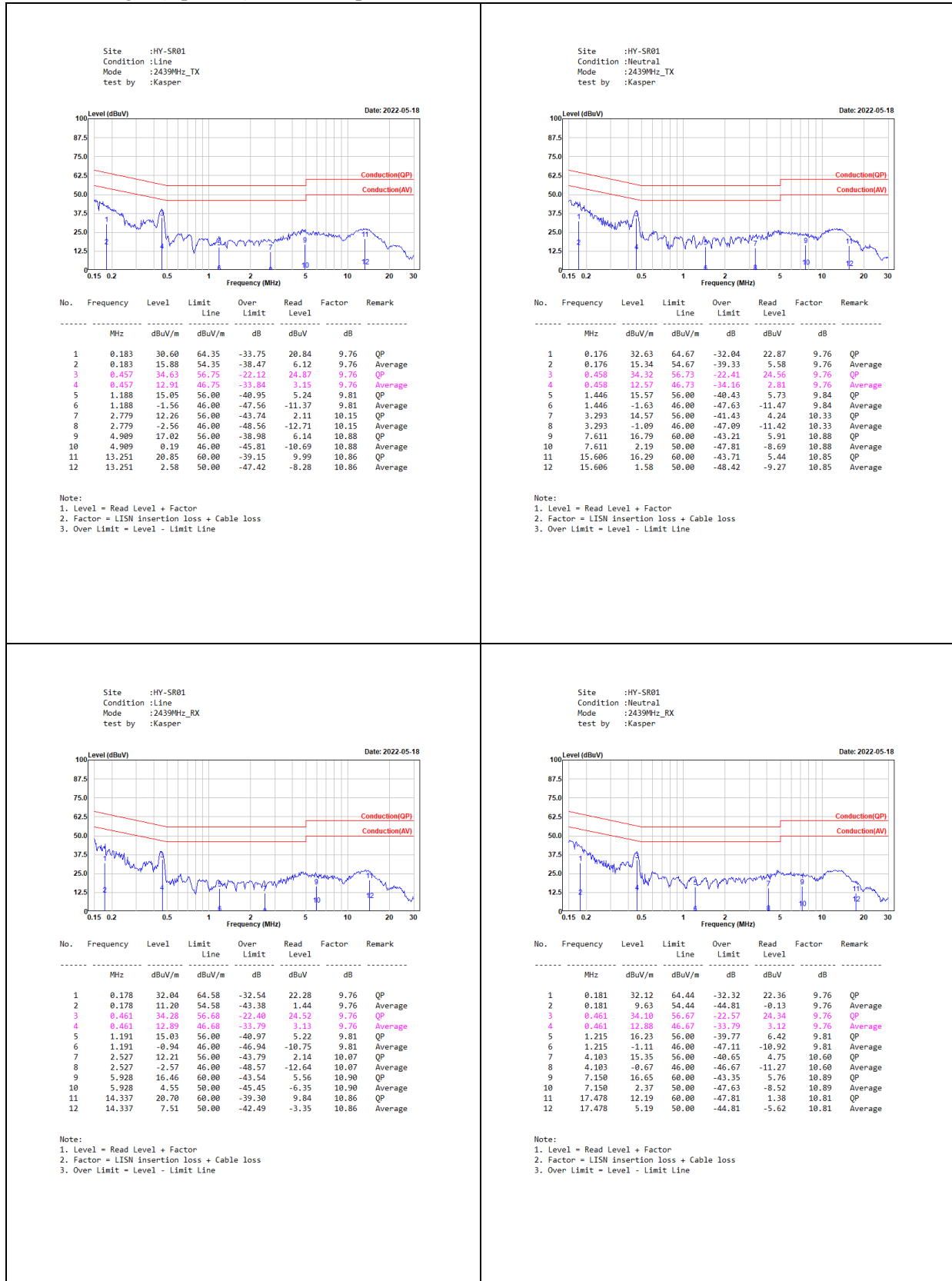
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

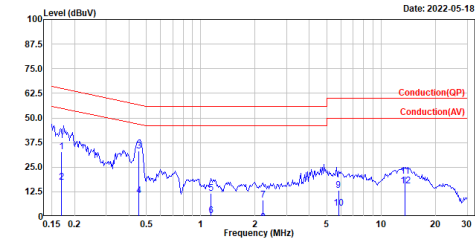
2.4. Test Result of Conducted Emission

Power Charger (Optional) +36W Adapter



36W Adapter

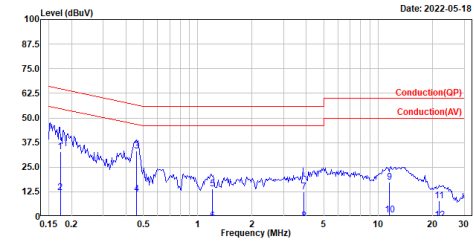
Site :HY-SR01
Condition :Line
Mode :2439MHz_TX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	0.169	32.86	64.99	-32.13	23.09	9.77	QP
2	0.169	17.36	54.99	-37.63	7.59	9.77	Average
3	0.453	33.09	56.82	-23.73	23.33	9.76	QP
4	0.453	10.66	46.82	-36.16	0.90	9.76	Average
5	1.144	11.65	56.00	-44.35	1.85	9.80	QP
6	1.144	0.21	46.00	-45.79	-9.59	9.80	Average
7	2.221	8.33	56.00	-47.67	-1.63	9.96	QP
8	2.221	-3.13	46.00	-49.13	-13.09	9.96	Average
9	5.799	13.37	60.00	-46.63	2.47	10.90	QP
10	5.799	4.03	50.00	-45.97	-6.87	10.90	Average
11	13.561	20.28	60.00	-39.72	9.42	10.86	QP
12	13.561	15.32	50.00	-34.68	4.46	10.86	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

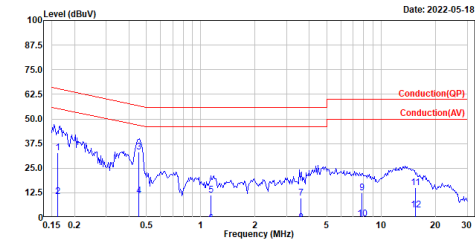
Site :HY-SR01
Condition :Neutral
Mode :2439MHz_TX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	0.174	32.92	64.79	-31.87	23.16	9.76	QP
2	0.174	12.19	54.79	-42.60	2.43	9.76	Average
3	0.458	33.24	56.72	-23.48	23.48	9.76	QP
4	0.458	11.21	46.72	-35.51	1.45	9.76	Average
5	1.209	13.91	56.00	-42.09	4.10	9.81	QP
6	1.209	-2.27	46.00	-48.27	-12.00	9.81	Average
7	3.863	12.45	56.00	-43.55	1.93	10.52	QP
8	3.863	-2.13	46.00	-48.13	-12.65	10.52	Average
9	11.531	17.48	60.00	-42.52	6.62	10.86	QP
10	11.531	0.63	50.00	-49.37	-10.23	10.86	Average
11	21.776	7.85	60.00	-52.15	-2.87	10.72	QP
12	21.776	-2.07	50.00	-52.07	-12.79	10.72	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

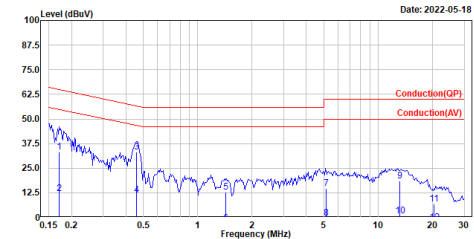
Site :HY-SR01
Condition :Line
Mode :2439MHz_RX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	0.161	32.75	65.41	-32.66	22.98	9.77	QP
2	0.161	10.57	55.41	-44.84	0.80	9.77	Average
3	0.454	33.28	56.80	-23.52	23.52	9.76	QP
4	0.454	10.84	46.80	-35.96	1.08	9.76	Average
5	1.142	11.14	56.00	-44.86	1.34	9.80	QP
6	1.142	-3.03	46.00	-49.03	-12.63	9.80	Average
7	3.593	9.68	56.00	-46.32	-0.75	10.43	QP
8	3.593	-2.81	46.00	-48.81	-13.24	10.43	Average
9	7.836	12.50	60.00	-47.50	1.62	10.88	QP
10	7.836	-0.85	50.00	-50.85	-11.73	10.88	Average
11	15.437	15.13	60.00	-44.87	4.28	10.85	QP
12	15.437	3.92	50.00	-46.08	-6.93	10.85	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

Site :HY-SR01
Condition :Neutral
Mode :2439MHz_RX
test by :Kasper

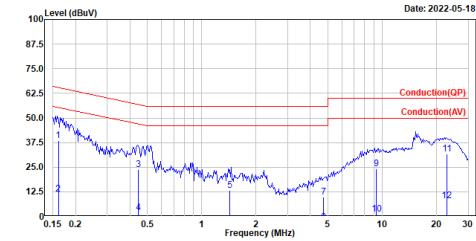


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	0.170	33.06	64.95	-31.89	23.29	9.77	QP
2	0.170	12.01	54.95	-42.94	2.24	9.77	Average
3	0.458	33.19	56.72	-23.53	23.43	9.76	QP
4	0.458	11.17	46.72	-35.55	1.41	9.76	Average
5	1.427	12.72	56.00	-43.28	2.88	9.84	QP
6	1.427	-3.11	46.00	-49.11	-12.95	9.84	Average
7	5.154	14.68	60.00	-45.32	3.77	10.91	QP
8	5.154	-0.50	50.00	-50.50	-11.41	10.91	Average
9	13.192	18.30	60.00	-41.70	7.44	10.86	QP
10	13.192	0.70	50.00	-49.30	-10.16	10.86	Average
11	20.366	6.79	60.00	-53.21	-3.97	10.76	QP
12	20.366	-2.57	50.00	-52.57	-13.33	10.76	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

65W Adapter

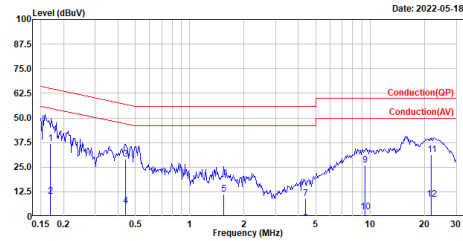
Site :HY-SR01
Condition :Line
Mode :2439MHz_TX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
	MHz	dBuV/m	dB	dB	dB		
1	0.161	38.35	65.42	-27.07	28.58	9.77	QP
2	0.161	11.30	55.42	-44.12	1.53	9.77	Average
3	0.445	23.88	56.97	-33.09	14.12	9.76	QP
4	0.445	2.04	46.97	-44.93	-7.72	9.76	Average
5	1.426	13.16	56.00	-42.84	3.32	9.84	QP
6	1.426	-4.51	46.00	-50.51	-14.35	9.84	Average
7	4.721	9.89	56.00	-46.11	-9.93	10.82	QP
8	4.721	-3.09	46.00	-49.09	-13.91	10.82	Average
9	9.260	24.09	60.00	-35.91	13.22	10.87	QP
10	9.260	1.12	50.00	-48.88	-9.75	10.87	Average
11	22.722	31.79	60.00	-28.21	21.09	10.70	QP
12	22.722	0.01	50.00	-41.99	-2.69	10.70	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

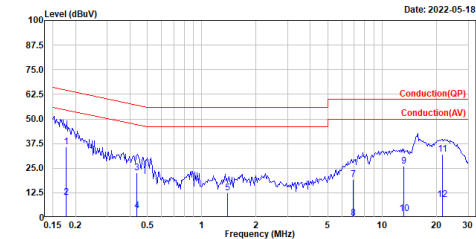
Site :HY-SR01
Condition :Neutral
Mode :2439MHz_TX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
	MHz	dBuV/m	dB	dB	dB		
1	0.169	37.12	65.02	-27.90	27.35	9.77	QP
2	0.169	10.34	55.02	-44.68	0.57	9.77	Average
3	0.441	28.91	57.04	-28.13	19.15	9.76	QP
4	0.441	5.19	47.04	-41.85	-4.57	9.76	Average
5	1.539	11.21	56.00	-44.79	1.36	9.85	QP
6	1.539	-5.05	46.00	-51.05	-14.90	9.85	Average
7	4.373	8.92	56.00	-47.08	-1.77	10.69	QP
8	4.373	-3.43	46.00	-49.43	-14.12	10.69	Average
9	9.394	26.19	60.00	-33.81	15.32	10.87	QP
10	9.394	2.17	50.00	-47.83	-8.70	10.87	Average
11	21.827	31.47	60.00	-28.53	20.75	10.72	QP
12	21.827	8.52	50.00	-41.48	-2.20	10.72	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

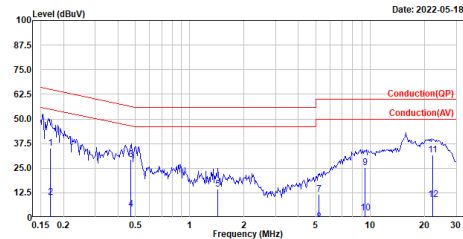
Site :HY-SR01
Condition :Line
Mode :2439MHz_RX
test by :Kasper



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
	MHz	dBuV/m	dB	dB	dB		
1	0.178	35.67	64.59	-28.92	25.91	9.76	QP
2	0.178	10.15	54.59	-44.44	0.39	9.76	Average
3	0.439	22.48	57.08	-34.60	12.72	9.76	QP
4	0.439	3.23	47.08	-43.85	-6.53	9.76	Average
5	1.387	12.55	56.00	-43.45	2.73	9.82	QP
6	1.387	-4.53	46.00	-50.53	-14.55	9.82	Average
7	6.928	19.10	60.00	-40.90	8.21	10.89	QP
8	6.928	-0.22	50.00	-50.22	-11.11	10.89	Average
9	13.163	26.08	60.00	-33.92	15.22	10.86	QP
10	13.163	1.81	50.00	-48.19	-9.05	10.86	Average
11	21.474	32.01	60.00	-27.99	21.29	10.72	QP
12	21.474	9.14	50.00	-40.86	-1.58	10.72	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

Site :HY-SR01
Condition :Neutral
Mode :2439MHz_RX
test by :Kasper



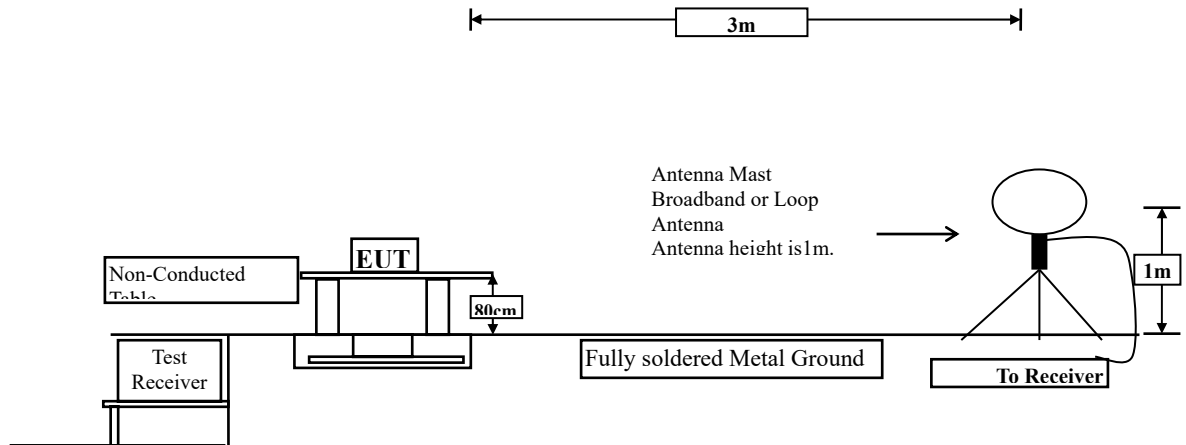
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
	MHz	dBuV/m	dB	dB	dB		
1	0.169	35.01	65.00	-29.99	25.24	9.77	QP
2	0.169	10.26	55.00	-44.74	0.49	9.77	Average
3	0.472	29.26	56.47	-27.21	19.50	9.76	QP
4	0.472	4.33	46.47	-42.14	-5.43	9.76	Average
5	1.428	14.18	56.00	-41.82	4.34	9.84	QP
6	1.428	-4.39	46.00	-50.39	-14.23	9.84	Average
7	5.177	11.79	60.00	-48.21	0.88	10.91	QP
8	5.177	-2.24	50.00	-52.24	-13.15	10.91	Average
9	9.400	25.43	60.00	-34.57	14.56	10.87	QP
10	9.400	2.10	50.00	-47.90	-8.77	10.87	Average
11	22.214	31.79	60.00	-28.21	21.09	10.70	QP
12	22.214	9.23	50.00	-40.77	-1.47	10.70	Average

Note:
1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

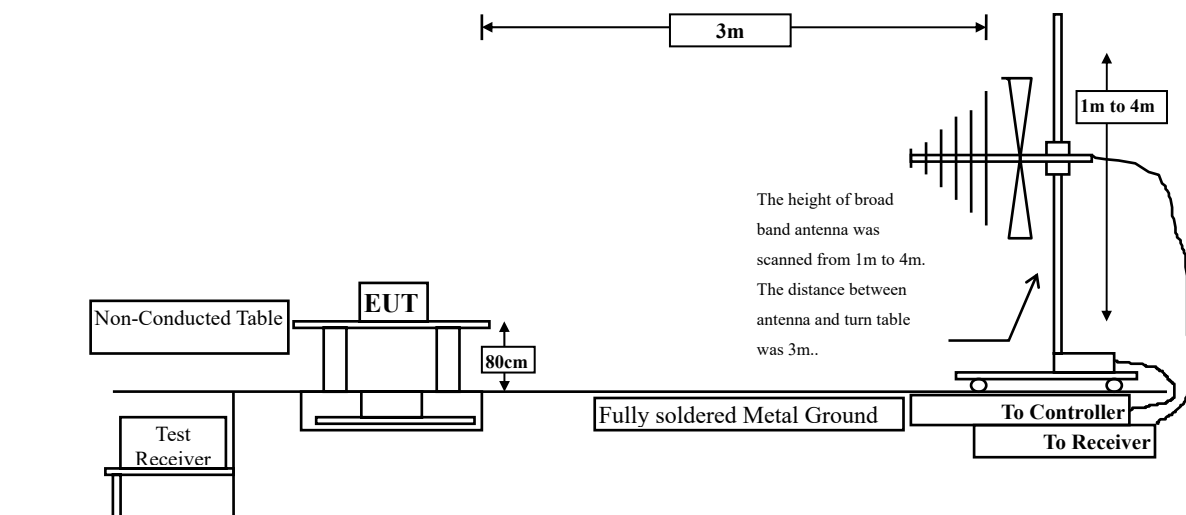
3. Radiated Emission

3.1. Test Setup

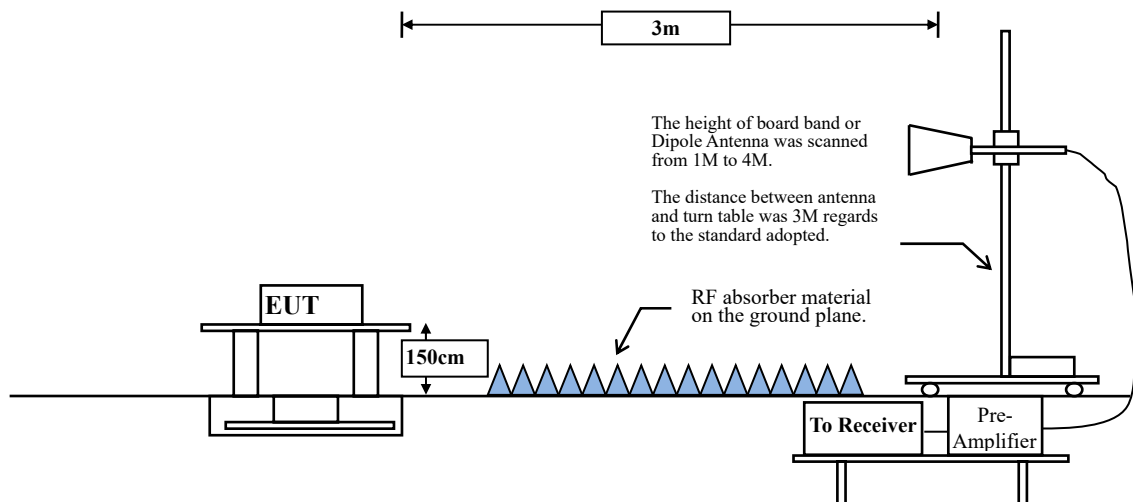
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

Remarks : 1. RF Voltage (dBμV /m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

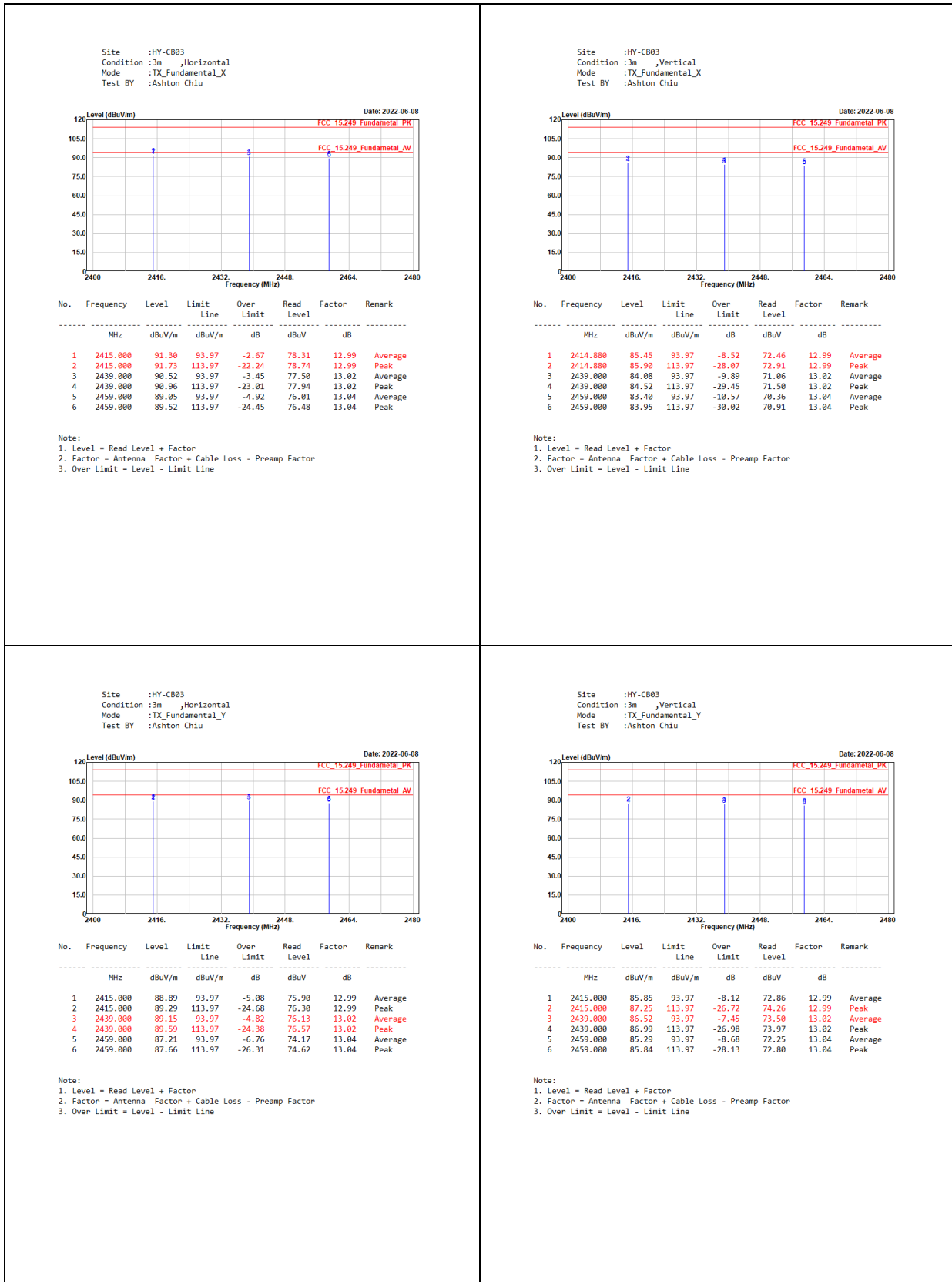
Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

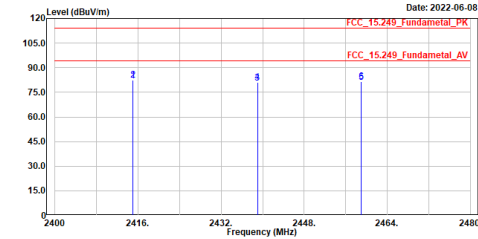
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission



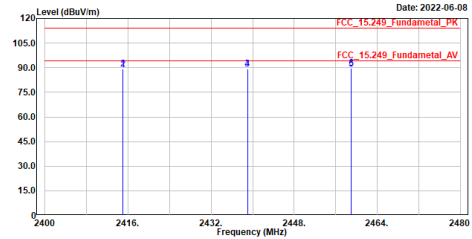
Site :HY-CB03
Condition :3m ,Horizontal
Mode :TX_Fundamental_Z
Test BY :Ashton Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2415.000	82.13	93.97	-11.84	69.14	12.99	Average
2	2415.000	82.59	113.97	-31.38	69.60	12.99	Peak
3	2439.000	80.83	93.97	-13.14	67.81	13.02	Average
4	2439.000	81.23	113.97	-32.74	68.22	13.01	Peak
5	2459.000	81.24	93.97	-12.73	68.20	13.04	Average
6	2459.000	81.67	113.97	-32.30	68.63	13.04	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

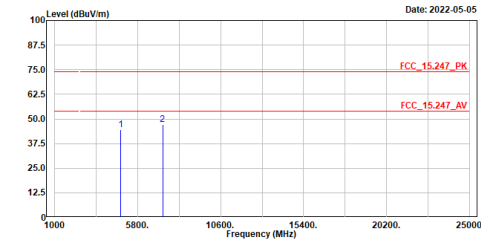
Site :HY-CB03
Condition :3m ,Vertical
Mode :TX_Fundamental_Z
Test BY :Ashton Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2415.000	88.96	93.97	-5.01	75.97	12.99	Average
2	2415.000	89.37	113.97	-24.60	76.38	12.99	Peak
3	2439.000	89.00	93.97	-4.97	75.98	13.02	Average
4	2439.000	89.38	113.97	-24.59	76.36	13.02	Peak
5	2459.000	89.16	93.97	-4.81	76.12	13.04	Average
6	2459.000	89.55	113.97	-24.42	76.51	13.04	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

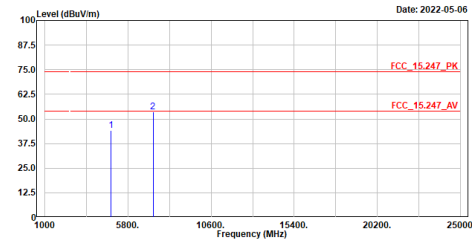
Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2415MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4830.000	44.55	74.00	-29.45	43.65	0.90	Peak
2	7245.000	47.09	74.00	-26.91	43.12	3.97	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

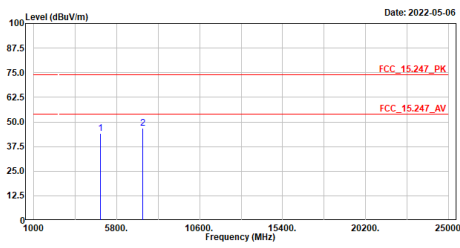
Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2415MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4830.000	43.98	74.00	-30.02	43.12	0.86	Peak
2	7245.000	53.59	74.00	-20.41	49.62	3.97	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2439MHz
Test BY :Jing Chang

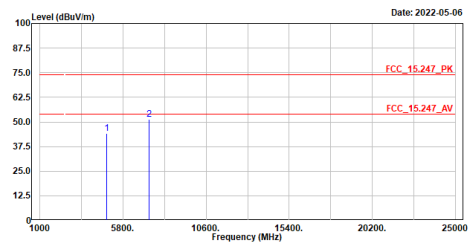


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	4878.000	44.19	74.00	-29.81	43.27	0.92	Peak
2	7317.000	46.64	74.00	-27.36	42.68	3.96	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2439MHz
Test BY :Jing Chang

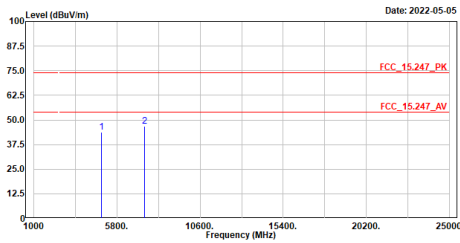


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	4878.000	44.19	74.00	-29.81	43.29	0.90	Peak
2	7317.000	51.29	74.00	-22.71	47.32	3.97	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2459MHz
Test BY :Jing Chang

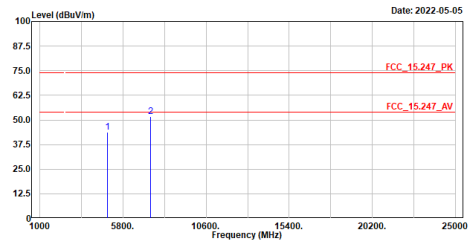


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	4918.000	43.82	74.00	-30.18	42.83	0.99	Peak
2	7377.000	46.62	74.00	-27.38	42.52	4.10	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2459MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	4918.000	43.80	74.00	-30.20	42.81	0.99	Peak
2	7377.000	51.57	74.00	-22.43	47.58	3.99	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

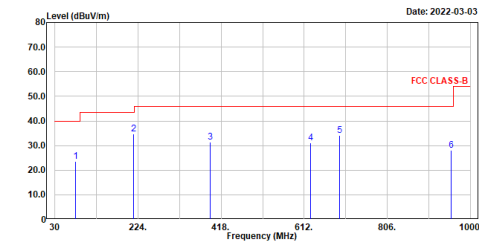


Power Charger (Optional) +36W Adapter



Power Charger (Optional)

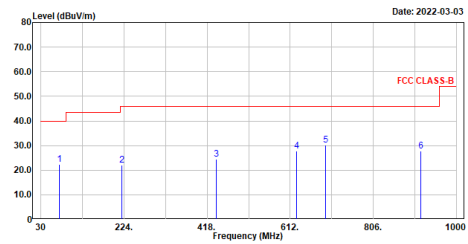
Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2439MHz
Test BY :Ashton Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	78.500	23.58	40.00	-16.42	47.59	-24.01	QP
2	214.300	34.85	43.50	-8.65	57.15	-22.30	QP
3	391.810	31.54	46.00	-14.46	48.42	-16.88	QP
4	626.550	31.02	46.00	-14.98	42.76	-11.74	QP
5	694.450	34.12	46.00	-11.88	44.87	-10.75	QP
6	955.300	28.15	46.00	-17.85	35.60	-7.45	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2439MHz
Test BY :Ashton Chiu

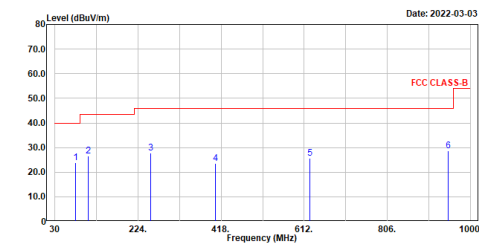


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	72.600	22.38	40.00	-17.62	44.62	-22.24	QP
2	218.100	22.17	46.00	-23.83	44.44	-22.27	QP
3	440.310	24.55	46.00	-21.45	39.94	-15.39	QP
4	626.550	27.88	46.00	-18.12	39.62	-11.74	QP
5	695.420	30.04	46.00	-15.96	40.77	-10.73	QP
6	917.550	27.86	46.00	-18.14	35.68	-7.82	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

36W Adapter

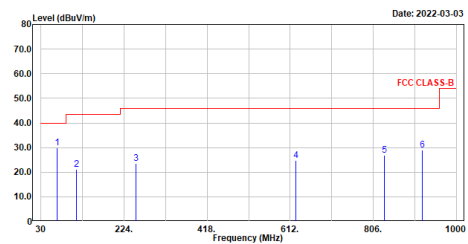
Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2439MHz
Test BY :Ashton Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	78.500	23.86	40.00	-16.14	47.87	-24.01	QP
2	108.570	26.62	43.50	-16.88	49.64	-23.02	QP
3	253.100	27.91	46.00	-18.09	48.70	-20.79	QP
4	405.390	23.47	46.00	-22.53	40.06	-16.59	QP
5	624.610	25.55	46.00	-20.45	37.36	-11.81	QP
6	947.620	28.68	46.00	-17.32	36.24	-7.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2439MHz
Test BY :Ashton Chiu

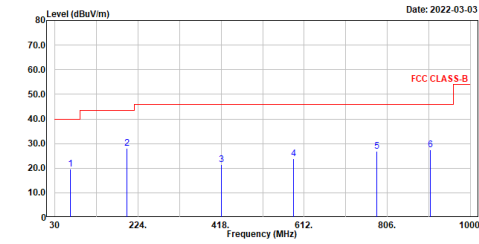


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	67.830	29.84	40.00	-10.16	51.22	-21.38	QP
2	113.420	21.27	43.50	-22.23	43.65	-22.38	QP
3	251.160	23.45	46.00	-22.55	44.29	-20.84	QP
4	625.580	24.75	46.00	-21.25	36.53	-11.78	QP
5	831.220	26.81	46.00	-19.19	35.79	-8.98	QP
6	920.460	28.87	46.00	-17.13	36.68	-7.81	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

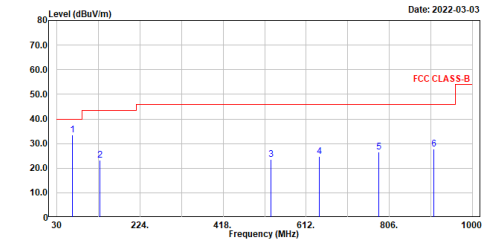
65W Adapter

Site :966-3
Condition :3m HORIZONTAL
Mode :TX 2439MHz
Test BY :Ashton Chiu



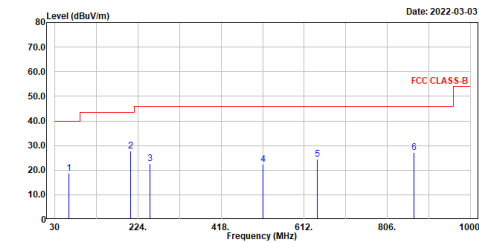
Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-3
Condition :3m VERTICAL
Mode :TX 2439MHz
Test BY :Ashton Chiu



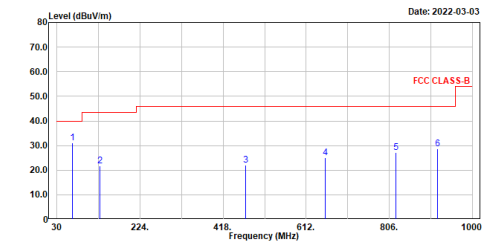
Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-3
Condition :3m HORIZONTAL
Mode :RX 2439MHz
Test BY :Ashton Chiu



Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-3
Condition :3m VERTICAL
Mode :RX 2439MHz
Test BY :Ashton Chiu

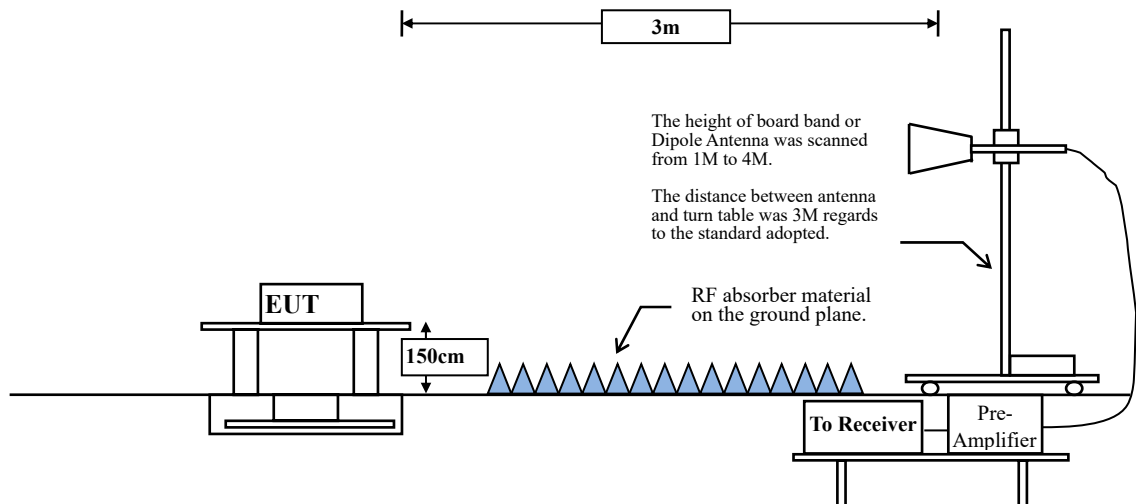


Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

4. Band Edge

4.1. Test Setup

RF Radiated Measurement:



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

4.3. Test Procedure

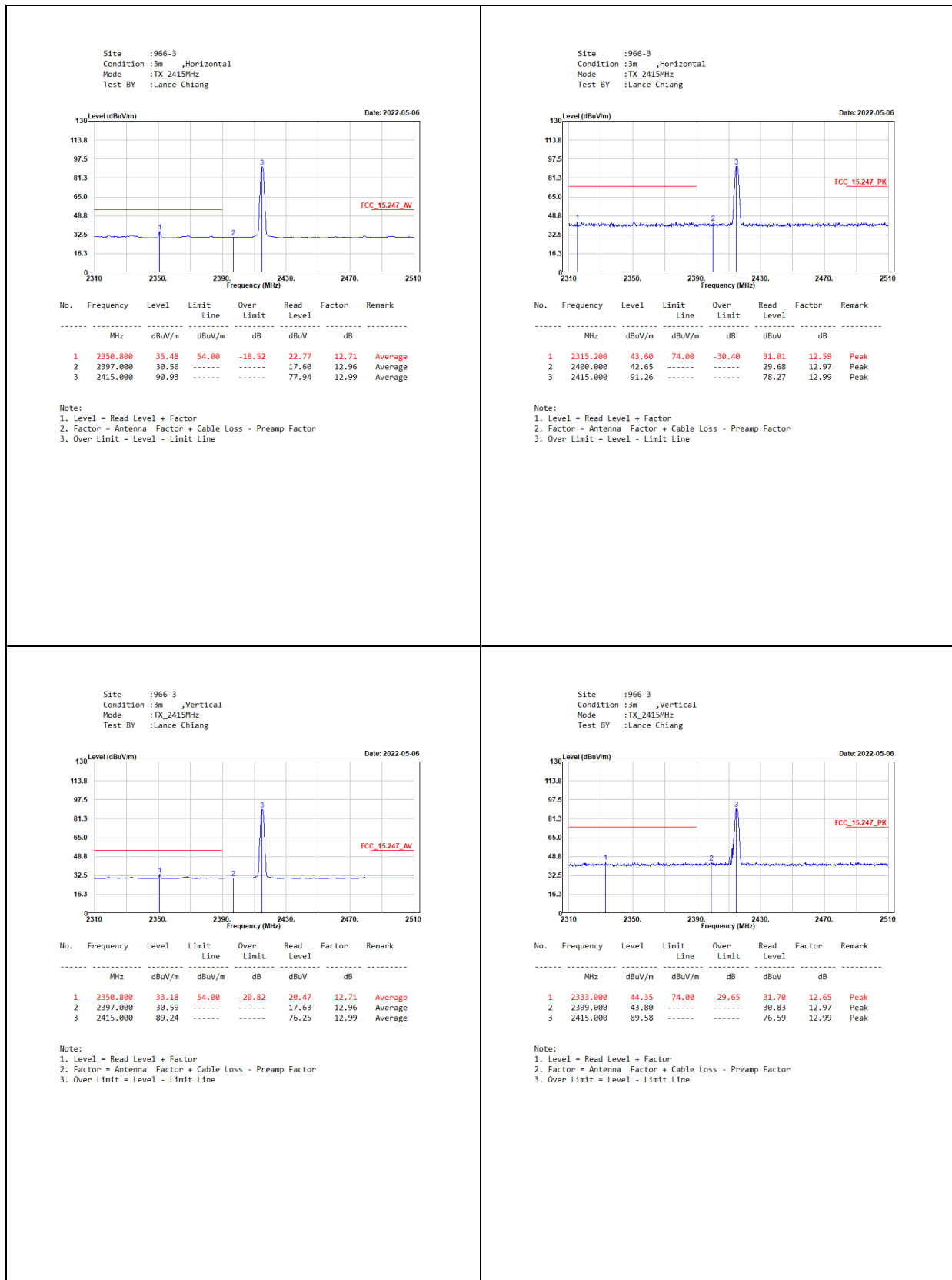
The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

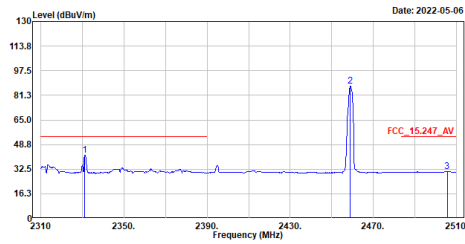
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Test Result of Band Edge



Site :966-3
Condition :3m ,Horizontal
Mode :TX_2459MHz
Test BY :Lance Chiang

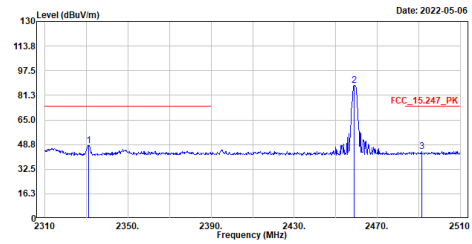


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2331.200	41.91	54.00	-12.09	29.27	12.64	Average
2	2459.000	87.32	54.00	-22.92	17.95	13.13	Average
3	2505.600	31.08	54.00	-22.92	17.95	13.13	Average

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,Horizontal
Mode :TX_2459MHz
Test BY :Lance Chiang

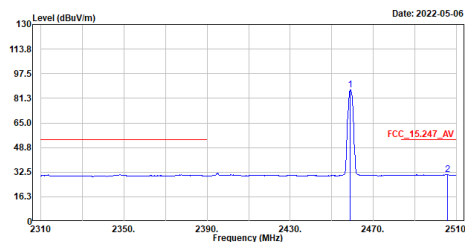


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2331.200	48.26	74.00	-25.74	35.62	12.64	Peak
2	2459.000	87.64	74.00	-13.64	74.60	13.04	Peak
3	2491.400	44.05	74.00	-29.95	30.96	13.09	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,Vertical
Mode :TX_2459MHz
Test BY :Lance Chiang

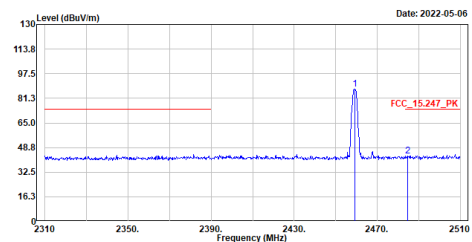


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2459.000	87.01	54.00	-33.01	73.97	13.04	Average
2	2505.600	30.92	54.00	-23.08	17.79	13.13	Average

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,Vertical
Mode :TX_2459MHz
Test BY :Lance Chiang



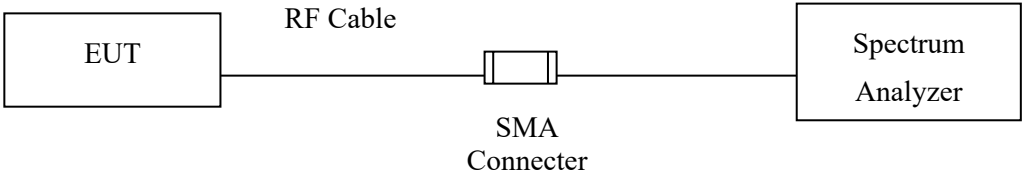
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2459.000	87.34	54.00	-33.34	74.30	13.04	Peak
2	2484.600	43.33	74.00	-30.67	30.25	13.08	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

5. Duty Cycle

5.1. Test Setup



5.2. Test Result of Duty Cycle

Product : Motorized Cellular Shade
 Test Item : Duty Cycle Data
 Test Mode : Mode 1: Transmit

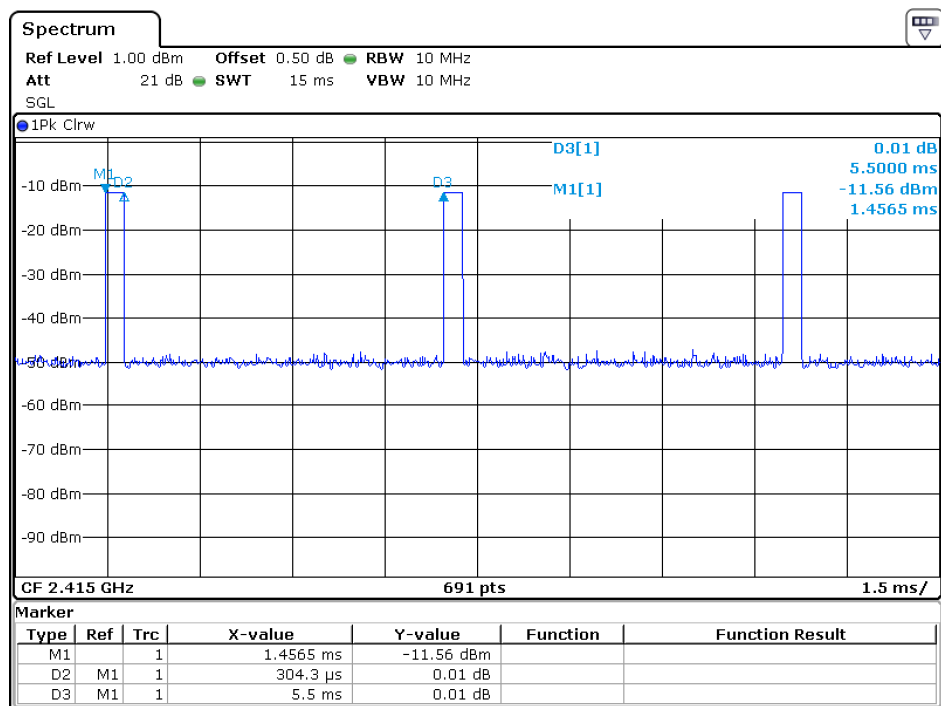
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
GFSK	0.3040	5.50	5.53	12.57



Date: 7.JUN.2022 05:06:03

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.